

Claims

1. A side-pumped, fiber laser system, comprising:
a double clad laser fiber having a numerical aperture and at least one flat surface, and having at least one core doped with at least one element which is photo-emissive in response to
5 electromagnetic radiation of a particular wavelength; and
a plurality of delivery fibers, each contiguous with the periphery of internal cladding of said laser fiber;
characterized by the improvement comprising:
each said delivery fiber delivering electromagnetic radiation
10 into said laser fiber at an acute angle selected to provide substantially total internal reflection within said laser fiber of any electromagnetic radiation transmitted into said internal cladding;
each said delivery fiber having a numerical aperture which is one-half or less of the numerical aperture of said laser fiber; and
15 the refractive index of the core of each said delivery fiber being substantially equal to the refractive index of said inner cladding of said laser fiber.
2. A system according to claim 1 wherein:
said delivery fibers are attached to said periphery by fusion.
3. A system according to claim 1 wherein:
said delivery fibers are attached to said periphery by bonding with epoxy resin.
4. A system according to claim 3 wherein:
said delivery fibers are attached to said periphery by means of an adhesive having an effective index of refraction substantially the

5 same as said index of refraction of said core of each said delivery
fiber.

5. A system according to claim 1 wherein:
said delivery fibers are attached to said periphery along
substantially the entire length of said laser fiber.

6. A system according to claim 1 further comprising:
a substrate structure, said laser fiber being wrapped around
said substrate structure.

7. A system according to claim 1 wherein said laser fiber
has a single core.

8. A system according to claim 1 wherein said laser fiber
has multiple cores.

9. A drum laser, comprising:
a cylindrical substrate structure;
a double clad laser fiber having internal cladding and having
at least one core doped with at least one element which is photo-
5 emissive in response to electromagnetic radiation of a particular
wavelength, said laser fiber having first and second sides, at least
said first side being flat, said laser fiber being wrapped around said
substrate structure with said second side in contact with said
structure; and

10 a plurality of delivery fibers, each contiguous with said first
side;

characterized by the improvement comprising:

15 each said delivery fiber attached to said first side at an acute angle selected to provide substantially total internal reflection within said laser fiber of any electromagnetic radiation transmitted into said internal cladding;

each said delivery fiber having a numerical aperture which is one-half or less of the numerical aperture of said laser fiber; and

20 the refractive index of the core of each said delivery fiber being substantially equal to the refractive index of said inner cladding of said laser fiber.

10. A system according to claim 9 wherein:
said delivery fibers are attached to said first side by fusion.

11. A system according to claim 9 wherein:
said delivery fibers are attached to said first side by bonding with epoxy resin.

12. A system according to claim 9 wherein:
said delivery fibers are attached to said first side by means of an adhesive having an effective index of refraction substantially the same as the index of refraction of each said delivery fiber core.

13. A system according to claim 9 wherein:
said delivery fibers are attached to said first side along substantially the entire length of said laser fiber.

14. A system according to claim 9 wherein said laser fiber has a single core.

15. A system according to claim 9 wherein said laser fiber has multiple cores.